

## **CLAIMS**

The following listing of claims replaces all prior versions and listings of claims in the above-referenced application:

1           1. (Previously presented) A polaroid encoder system for detecting  
2 movement, said system comprising:

3           a movable polarizing code element comprising a first concentric code, a  
4 second concentric code and a set of quadrants, the first and second concentric codes  
5 in contact with one another over one of the four quadrants of said movable polarizing  
6 code element;

7           a detector module to detect an amplitude based on how much illumination  
8 passes through a first portion of said movable polarizing code element, said detector  
9 module comprising:

10           a first illumination detector covered with a first static polarizing filter  
11 that is oriented in a first direction;

12           a second illumination detector covered with a second static polarizing  
13 filter that is oriented in a second direction;

14           a first determination module to identify a quadrant of said movable polarizing  
15 code element based on how much illumination passes through a second portion of  
16 said movable polarizing code element, the first determination module responsive to a  
17 single illumination source that emits light that is directed at and unaltered before  
18 encountering the movable polarizing code element and thereafter unaltered before  
19 encountering a third illumination detector; and

20           a second determination module coupled to receive said amplitude and said  
21 quadrant and configured to determine an angular position of said movable polarizing  
22 code element using said amplitude and said quadrant.

1           2. (Previously presented) The system of Claim 1, further comprising:  
2           a controller module coupled to receive said angular position of said movable  
3 polarizing code element, wherein said controller module uses said angular position to  
4 control a movable device coupled with said movable polarizing code element.

1           3. (Previously presented) The system of Claim 2, wherein said  
2 controller module is selected from the group consisting of a neural network controller,  
3 a fuzzy logic controller, a proportional integral derivations controller, and a motor  
4 controller.

1           4. (Previously presented) The system of Claim 1, wherein said second  
2 direction is substantially perpendicular to said first direction.

1           5. (Previously presented) The system of Claim 4, wherein said first  
2 illumination detector and said second illumination detector each comprise a  
3 photodiode.

1           6. (Previously presented) The system of Claim 1, wherein said first  
2 and second concentric codes are substantially opaque.

1           7. (Previously presented) The system of Claim 6, wherein said first  
2 and second concentric codes are located within a segment of said second portion of  
3 said movable polarizing code element.

1           8. (Previously presented) The system of Claim 1, wherein said first  
2 determination module further comprises a second illumination detector located on the  
3 same side of said movable polarizing code element as said first and second  
4 illumination detectors of said detector module.

1           9. (Previously presented) A method for determining angular position  
2 of a movable polarizing code element, said method comprising:  
3           illuminating said movable polarizing code element comprising a first  
4 concentric code, a second concentric code and a set of quadrants, the first and second  
5 concentric codes in contact with one another over one of the quadrants of said  
6 movable polarizing code element, said illuminating comprising an illumination source  
7 such that emitted light is directed at and unaltered before encountering the movable  
8 polarizing code element and thereafter unaltered before encountering a third

9       illumination detector;

10           detecting a first amplitude based on how much illumination passes through a  
11       first portion of said movable polarizing code element and a first static polarizing filter  
12       oriented in a first direction, said detecting said first amplitude comprises utilizing a  
13       first photodiode;

14           detecting a second amplitude based on how much illumination passes through  
15       said first portion of said movable polarizing code element and a second static  
16       polarizing filter oriented in a second direction, said detecting said second amplitude  
17       comprises utilizing a second photodiode;

18           determining a quadrant of said movable polarizing code element based on how  
19       much illumination passes through a second portion of said movable polarizing code  
20       element, said determining said quadrant comprises utilizing a third photodiode,  
21       wherein said first, second, and third photodiodes are located on one side of said  
22       movable polarizing code element; and

23           determining said angular position of said movable polarizing code element  
24       using said first amplitude, second amplitude and said quadrant.

1           10. (Previously presented) The method as described in Claim 9, further  
2       comprising:

3           utilizing said angular position to control movable apparatus coupled with said  
4       movable polarizing code element.

1           11. (Previously presented) The method as described in Claim 9,  
2       wherein said first and second concentric codes are substantially opaque.

1           12. (Previously presented) The method as described in Claim 11,  
2       wherein said determining said quadrant comprises utilizing said substantially opaque  
3       first and second concentric codes.

1           13. (Previously presented) The method as described in Claim 12,  
2       wherein said determining said quadrant further comprises utilizing a fourth  
3       photodiode.

1           14. (Previously presented) The method as described in Claim 9,  
2 wherein said first direction is substantially perpendicular to said second direction.

1           15. (Previously presented) The method as described in Claim 10,  
2 wherein said utilizing said angular position to control said movable apparatus is  
3 performed by a controller module.

1           16. (Previously presented) The method as described in Claim 9,  
2 wherein said controller module is selected from the group consisting of a neural  
3 network controller, a fuzzy logic controller, a proportional integral derivations  
4 controller, and a motor controller.

1           17. (Previously presented) A system for determining angular position of  
2 a movable polarizing code element, said system comprising:

3           means for illuminating said movable polarizing code element comprising a  
4 first concentric code, a second concentric code and a set of quadrants, the first and  
5 second concentric codes in contact with one another over one of the quadrants of said  
6 movable polarizing code element, said means for illuminating comprising an  
7 illumination source such that emitted light is directed at and unaltered before  
8 encountering the movable polarizing code element and thereafter unaltered before  
9 encountering a third illumination detector;

10          means for detecting a first amplitude based on how much illumination passes  
11 through said first portion of said movable polarizing code element and a first static  
12 polarizing filter oriented in a first direction;

13          means for detecting a second amplitude based on how much illumination  
14 passes through said first portion of said movable polarizing code element and a  
15 second static polarizing filter oriented in a second direction;

16          means for identifying a quadrant of said movable polarizing code element  
17 based on how much illumination passes through a second portion of said movable  
18 polarizing code element, wherein said means for identifying said quadrant comprises  
19 an illumination detector; and

20 means for determining said angular position of said movable polarizing code  
21 element using said first amplitude, second amplitude and said quadrant.

1 18. (Original) The system of Claim 17, further comprising:  
2 means for utilizing said angular position to move an apparatus coupled with  
3 said movable polarizing code element.

1 19. (Previously presented) The system of Claim 17, wherein said first  
2 and second concentric codes are substantially opaque.

1 20. (Previously presented) The system of Claim 19, wherein said first  
2 and second concentric codes substantially obscures illumination from being received  
3 by said illumination detector of said means for identifying said quadrant.

1 21. (Previously presented) The system of Claim 17, wherein said first  
2 direction is substantially perpendicular to said second direction.

1 22. (Previously presented) The system of Claim 17, wherein said means  
2 for detecting said first amplitude comprises a photodiode covered by said first static  
3 polarizing filter.